APPENDIX

<u>IN THE TITLE</u>:

METHOD AND [APPARATUS] <u>SYSTEM USING CARRIER</u>

<u>IDENTIFICATION INFORMATION</u> FOR TRACKING PRINTED ARTICLES

att. to paper #6

Draft Disclosure

Cr ated By: Michael Bartholet   Created On:
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Required fields are marked with the asterisk (*) and must be filled in to complete the form .

Summary

Status	Draft
Owning Division	PSC
PVT Score	To calculate a PVT score, use the 'Calculate PVT' button.

Inventors with Lotus Notes IDs

Inventors: Michael Bartholet/Boulder/IBM, Carol Dwyer/Boulder/IBM, Kyle Manning/Boulder/IBM

Inventors without Lotus Notes IDs

Main Idea

Title of disclosure (in English)

Label Maker Use of Core Barcodes to Mount and Associate Spools and Reels

Idea of disclosure

1. Describe your invention, stating the problem solved (if appropriate), and indicating the advantages of using the invention.

2. How does the invention solve the problem or achieve an advantage,(a description of "the invention", including figures inline as appropriate)?

3. If the same advantage or problem has been identified by others (inside/outside IBM), how have those others solved it and does your solution differ and why is it better?

4. If the invention is implemented in a product or prototype, include technical details, purpose, disclosure details to others and the date of that implementation.

Vistakon Requirements.lwj Vistakon_Label_Func_Spec_Ver_1_1.lv Label Printer Interface Notes III.d

*Critical Questions (Questions 1 - 7 must be answered)
Patent Value Tool (Optional - this may be used by the inventor and attorney to assist with the evalua

(Form Revised 12/17/97)

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VISTAKON

ON-DEMAND

LABELER

REQUIREMENTS

M. Bartholet

Table of Contents

Overview

This document defines the requirements of a roll-to-roll label-making solution for Vistakon. The solution is built around the IBM InfoColor 70 printer, and includes a control system, a label varnisher and die-cutter, and a 3-up slitter. The control system receives input from Vistakon's order server to create on-demand labels, autoprint and finish them in reels, ready to be applied. Provided along with each finished reel is a data file containing information about the labels on the reel for Vistakon's carton-selecting robot (Vertical Stacker Grid or VSG) and label applicator, and for Vistakon's order server to verify completion or to notify if any reprint is necessary.

Vistakon makes spherical contact lenses for correcting focal length. At present they make and package the lenses to plan. They then pick and pack to order. Although procuring preprinted cartons has a considerable lead time, this works when the number of unique cartons for unique prescriptions (Stock Keeping Units or SKU's) is small, and the volume per SKU is high. Vistakon now wants to expand into toric contact lenses for correcting astigmatism. Toric lenses require *many* unique prescriptions. This means many more SKU's with unique carton labeling and smaller volumes per SKU. Procuring preprinted cartons to plan becomes impractical. The solution is to print labels on-demand for application to generic cartons as the orders come in.

Vistakon also wishes to seize the opportunity, provided with on-demand printing, to go beyond just marking each carton with its contents. Similar to how bank checks are offered, Vistakon wants to provide their customers with a selectable background image to personalize the appearance of each carton of lenses. Also to be printed on each carton label is the name of the eye-care provider (prescribing doctor) or lens retailer. Further, on-demand printing will allow a pre-translated caution statement to be selected for each customer's own language, eliminating the need for multiple repetitions.

A high degree of reliability and verification is required for this solution. What is printed must be accurate, the post-printing finishing must be defect-free, and the ability to apply the correct label to the right carton must be ensured. To accomplish this, verification points throughout the process will provide checks for print quality (both subjective and machine scanned), barcode identification of individually printed labels (and the orders, blocks, 3-up reels, and print runs that they make up), and post-printing finishing quality. If any defect is detected, the order (1 to 40 labels) containing an unusable label will be resubmitted for reprint, and the VSG and applicator, will be notified of the order which has been mapped out and its resubmission.

Label Material

White label print stock
- Roll
- Pinless
- Perfless
- No precuts

Format
- 320 mm (12.6 inch) maximum width
- 500 mm (19.7 inch) maximum diameter (about 88 pounds)
- 6 ± 0.020 inch (US) core diameter

InfoColor 70 Approved
- IBM to select from labels pre-approved for InfoColor 70
- Have samples sheets and specs from:
    - Avery:
        - Fasson Digital Print Media Uncoated Face, 50# MF Liner 7251
    - 3M:
        - 2 mil Vinyl Thermal Transfer Film, 3.2 mil Paper Liner 3690E
        - 5 mil Gloss Acrylate Thermal Transfer Film, 4.6 mil Paper Liner 3921
    - MACtac:
        - Uncoated 50# Paper Face, Kraft Liner TF6628
        - Semi-gloss 50# Coated Paper Face, Kraft Liner TF6627
- ❏ Test rolls will be ordered for best candidates (Sankaran)
- ❏ Test labels will be printed using Vistakon's sample file (Bartholet)
- ❏ Printed rolls will be sent to finishing vendor for: (Graham)
    - Varnishing
    - Die-Cutting
    - Slitting
- ❏ Final selection of label material will be made from results (Bartholet)

Varnish
- ❏ Sutherland rub test using 4 pound weight at 100 strokes (Sankaran)
    - No removal or smearing of toner
- Gloss to match the part of the carton that is not covered by the label
    - "Semi-gloss"
- Vistakon has provided sample boxes with gloss for matching
- ❏ Finishing vendor to help with varnish gloss matching (Graham)

Adhesive
- "Permanent": carton or label shows evidence of destruction upon removal
- Label suppliers are providing only "permanent" samples
- ❏ Permanence testing to be performed (Bartholet)

Label Format

Just one size for demo purposes.

95.3 mm x 74.9 mm
- These dimensions, with no tolerance, were provided by Vistakon.
- However, the real requirement is to fit around three sides of the assembled carton.
- The dimensions should be the maximum allowable, yet still prevent a label edge from protruding past a carton edge after the label has been applied.
- Vistakon has indicated a nominal label undersize of 1/16 inch all around is acceptable.
- The printed background image will extend beyond the die-cut, including allowance for all tolerances.
- The printed variable data will maintain a margin with respect to the die-cut, to allow for tolerances.
- ❏ Label dimensions & tolerances (S. Cooper)
    - ▫ Presently, looking at 101.01 mm x 76.2 mm for best fit with carton
    - ▫ Looking at 98.55 mm x 76.2 mm as a compromise for most efficient web layout
- ❏ Carton dimensions & tolerances - folded (S. Cooper)
- ❏ Aesthetics as applied on carton (S. Cooper)
- Die-cutting tolerance with respect to web edge is ± 0.010 inch
- Die-cutting tolerance in process direction with respect to printed target is ± 0.005 inch
- Printing tolerance with respect to web edge is ± 1 mm (0.040 inch)
- Printing tolerance in the process direction is ± 0.5 mm (0.020 inch)
- ❏ Application tolerance (MTC)

R 3 mm corners (4X)
- Provided by Vistakon, but can be modified for manufacturability purposes.
- For die-cutting and matrix-removal purposes, larger radii are better than smaller
- ❏ Aesthetics (S. Cooper)
- ❏ Presently, using 3.3 mm for radii (S. Cooper)

Barcode Cutout
- The area on the carton that has preprinted barcodes is to show through a corner cutout of the label.
- No specs provided for barcode area
- Have label and carton samples that show barcodes
- ❏ Layout being done by S. Cooper
    - ▫ Presently, looking at 42 mm x 27 mm for cutout

Web Layout

3-up
- ❑ As many labels across web as will fit (S. Cooper)
    - ▫ Presently, using 3-up

Orientation
- ❑ Confirming orientation requirements for applicator (MTC)

Spacing
- 3.18 mm (0.125 inch) minimum spacing between labels ·
- However, for matrix-removal, 6.35 mm (0.250 inch) is preferred
- 3.18 mm (0.125 inch) minimum spacing between label and edge of web or slit

Margins
- InfoColor 70 print width rules:
    - ▫ Full print width for Model 02C is 305 mm (12.0 inch).
      Therefore, equally divided edge margins for 320 mm (12.6 inch) wide paper is:
      7.5 mm (0.3 inch)
    - ▫ For less than the maximum paper width, the edge print margin is:
      5 mm (0.2 inch)

Page Length
- For purposes internal to printing process only
- ❑ Will result from layout. (S. Cooper)

Label Content - Templates

Fixed Template (Reser)
- Same for all labels within each order
  - For initial demo, same for all orders
- Background image
  - Just one for demo
  - Ultimately about 7
- Logo
  - "Johnson & Johnson"
  - Trademark color to be provided by Vistakon
- Brand
  - "ACUVUE"
- Common Text
- ☐ As necessary, reference targets for applicator registration (MTC)
- ☐ Vistakon to provide file of sample label already created (Bartholet)

Selectable Templates (Reser)
- Same for all labels within each order, might be different for each order
- Caution statement from library of about 20 languages
- Eye-care Provider / Retailer
  - Name
  - Address
  - Phone Number
  - Not provider's picture, nor retailer's logo
- ☐ Provider/retailer information may be handled as part of Variable Data for each label

Quantity of identical labels for each order

Label Content - Variable Data

Variable Data (Reser)
- Unique for each label, even between orders or between print jobs
  - Only repeated in the case of reprinting a rejected label
- None on the label
- Off label
  - Lot Number Barcode (128)
  - Product Code (UPC-A)

Off Label Content
- Front Side
  - Control Strip for densitometer before the beginning of the label print job
  - Registration marks for the die-cutter (Graham)
- Back Side (but see significant issues regarding this below)
  - Opposite each label
  - Lot Number Barcode (CODE 128)
    - 10 digits total
    - First 7 are for lot number for production control
    - Last 3 are for trail code (unique for each carton)
    - So, lot size can never exceed 999 cartons
  - Product Code (UPC-A)
    - Identical content as Lot Number
- ❑ There are possible service cost and click charge issues with doing any printing on the back side (Christian)
- ❑ There is a possible incompatibility issue with the intent to consider evolving to a true simplex version of the InfoColor 70 in the future (Kurpiewski)
- ❑ Alternatives to printing barcodes on the back side are: (Bartholet)
  - Printing on a "daughter" label on the front side, within the cutout area of each label
    - Need to confirm applicator's ability to apply the label but not the daughter label
  - Printing within the label itself, using a barcode format that would address Vistakon's concerns:
    - Aesthetics
    - Potential confusion with respect to barcode on box
    - Layout space for graphics on the label
    - ❑ There are some barcode formats which are nearly undetectable to the naked eye
    - ❑ There are others that are visible, but just look like a nonfunctional shaded area
    - ❑ Most practical choice would be a simple linear code that is
      - Just large enough to reliably scan
      - Small enough to be aesthetically acceptable to Vistakon

Carton Specs

Unfolded Carton
- Have engineering specs
- Have some samples (unprinted & uncoated)

Folded Carton
- Do not have specs
- Have some samples
  - Some with sample label applied
  - Some without label (printed directly on carton)

Gloss
- Have some samples of cartons with desired gloss
- These gloss-sample cartons are a different size & shape

Barcodes
- Laser-etched directly on carton
- In same area where label is cut out
- Contains same barcode information
- Same barcode formats

Print Station - InfoColor 70

Model 02C
- Reconditioned
- Warranty not included

- Includes 64 GB collator
- Includes densitometer for semiautomatic adjustments to:
    - Print registration
    - Color density
- Will use native roll feed
    - 500 mm (19.7 inch) maximum diameter roll capacity
    - Includes lift-assist device

- Cutter disabled
- Stacker disabled
- Duplex disabled
    - Except for Backside Black to print backside barcodes
        - But, see issues in Label Content - Variable Data on page 8

Print Station - Accumulator/Inspection/Cutoff/Rewinder

Accumulator
- Sufficient capacity is needed to allow for:
  - □ Inspecting the print with the densitometer
  - □ Manual cutting off the web
  - □ Changing the rewinder spool

  while permitting uninterrupted printing
- ❑ Have proposed a 10 minute capacity (250 feet) (Graham)

Inspection Station
- Opportunity to use densitometer for:
  - □ Print registration
  - □ Color density
- Clear view of printed page for subjective print quality evaluation
- ❑ Barcode Scanner (MTC)
  - □ To log where densitometer and subjective inspections occur
    - · Done by scanning the printed barcode of any label while it is in the inspection station and indicating "OK" or "Not OK" through the Control System GUI
    - · If "Not OK", the whole order for the label scanned will be logged "Not OK"
    - · Also logged "Not OK" would be the whole order in each adjacent 3-up row that was in the inspection station at the time
  - □ To also log the spool being used in the rewinder to roll up either:
    - · The entire print job, or
    - · The block of orders that will be cutoff from the larger print job

Cutoff
- Manual, slide-action cutoff
- Used at, either:
  - □ The end of the entire print job, or
  - □ Between blocks of orders within the print job

Rewinder
- Uses spools that have permanent barcodes for tracking and controlling:
  - □ Temporary staging after printing
  - □ Verification of mounting on the Die-cut station
- Until the spool is emptied and reused, this barcode is used to track the progress of:
  - □ The entire print job being wound up on it, or
  - □ The block of orders that was cutoff from the larger print job

Die-Cut Station - Coater

Unwinder
- Same capacity as the native roll feeder in the InfoColor 70
  - 320 mm (12.6 inch) maximum width roll.
  - 500 mm (19.7 inch) maximum diameter (about 88 pounds)
- Will use same lift-assist device as for InfoColor 70
- ❏ May wish to have a dual unwinder to facilitate splicing printed rolls back-to-back, to permit long, uninterrupted die-cut runs

Barcode Reader (MTC)
- Scans the permanent barcodes on
  - The spool of the input printed label roll, and
  - The 3-up reels of the output die-cut label rolls
- Used for reporting to the Control System, either:
  - What roll of printed labels has been mounted for die-cutting, or
  - Verification that the correct roll has been mounted
- To also log the reels being used in the 3-up rewinder for either:
  - The 3-up row of the entire print job being wound up on each reel, or
  - The 3-up row of the block of orders that was cut off from the larger print job
- Barcode scanner is also used to note, either
  - Good, unused orders remaining on input roll, if die-cut processing is interrupted, or
  - Input roll is now empty, OK to reuse

Coater / UV Drier
- Wants to keep running uninterrupted
- Hence, the accumulator immediately following

Accumulator
- Needed to allow Coater to continue uninterrupted in case anything downstream has to be stopped temporarily for any reason
- Capacity is the same as for accumulator in the Print Station (250 feet)

Die-Cut Station - Die-Cutter

Die-Cutter and Die
- Only one die needed for demo purposes
- Die to match 3-up layout of labels across the web
- Die to cut through facing material without cutting into backing material
- Die change ability requiring 30 minutes while off-line is acceptable

Matrix Rewinder
- Removes all non-label facing material from around the die-cuts
- Same capacity as the native roll feeder in the InfoColor 70
  - 320 mm (12.6 inch) maximum width roll
  - 500 mm (19.7 inch) maximum diameter
- At this point all non-label printing on the Front Side is removed
  - Die-cutter reference marks
  - Densitometer control strip
  - Other test patterns or control markings before, within, or after the print job
  - Reference targets, if needed, for the applicator remain within the label area

Die-Cut Station - 3-up Slitter

3-up Slitter
- The demo version requires only the one, fixed slit pattern to match the 3-up printing
- The slitter could be augmented to trim outer web edges if needed
- ❑ Being layed out at present (S. Cooper)

3-up Cutoff
- To permit 3-up reels to remain smaller
- Would be able to cutoff at order block boundaries within a larger print job
- Would be able to re-separate where:
  - ▫ Splicing to facilitate threading has occurred
  - ▫ Splicing to join print jobs has occurred

3-up Rewinder
- Uses reels that have permanent barcodes for tracking and controlling:
  - ▫ Temporary staging after die-cutting
  - ▫ Verification of mounting on the applicator station
- Until the reels are emptied and reused, these barcodes are used to track the progress of:
  - ▫ The 3-up row of the entire print job being wound up on each reel, or
  - ▫ The 3-up row of the block of orders that was cut off from the larger print job

Control System - Network

For the demo, the network will be stand-alone, not tied into the production system.

Vistakon does not have a separate order entry system at this time
- ❑ The Vertical Stacker Grid server may be able to double as Vistakon's order entry system (Yang)

For Vistakon's Vertical Stacker Grid:
- Pentium PC
- Windows NT
- Ethernet 100
- TCP/IP
- Visual Basic
- Oracle 8.0 database program

For reference, Vistakon's production system is:
- Sun
- UNIX
- Oracle
- Running DCS

Control System - Software

Function
- To control, track, and feedback all the label making processes

Software components:
- Label Control System - Client GUI:
  - A GUI program running on an NT environment
  - To monitor the printing process
- Label Control System - Server:
  - Part of the OSM server with special code for Vistakon to:
    1. Receive the order from Vistakon's order server,
    2. Build the Postscript file based on order information,
    3. Send the print job to the InfoColor 70 for printing,
    4. Receive the signals from the barcode readers,
    5. Update the client GUI for the entire label printing process,
    6. Be able to have the interface to the applicator and Vistakon's VSG system,
    7. Provide rework information, if necessary, back to the order server.
- Will be running on:
  - An IBM AIX environment
  - With DB2 database installed
  for tracking all the events occurring in the process.

Operation - Pre-Press

1. Vistakon's order server collects orders and holds for batching.

2. When desired, orders are passed to Control System in a batch for immediate printing.

3. Control System lays out orders for print job:

   A. Background templates and variable data are merged for individual labels

   B. Labels are kept in sequence for each order

   C. Orders are aligned in 3-up rows, so that:

      i. Each order is kept together in a single 3-up row

      ii. Orders are assigned to 3-up rows to maintain approximately even row lengths

   A. As necessary for later processing, orders are grouped into blocks, each of which provides a single cutoff point across all 3-up rows, to allow:

      i. The whole print job to be cutoff into smaller rolls/reels if desired

      ii. Adjustments/changeovers, if needed, for the die-cutter and/or the applicator within the larger print job

4. The Control System adds prior to and/or after the print job:

   A. Sufficient blank space for handling and for adjustments while printing

   B. Control Strip for Densitometer readings

Operation - Print Station

1. The Barcode Scanner is used to note:

    A. Which orders across the 3-up web were logged as OK (or not) in the inspection station

    B. Which spool is being used to roll up each block of orders or whole print job

2. Orders across the 3-up web are mapped out, if necessary, from the last good inspection to next good inspection.

    A. Mapping is passed to the Order Server, the Vertical Stacker Grid and the Applicator.

    B. Vistakon's order server adds mapped-out orders to the next print job.

Operation - Die-Cut Station

1. Printed roll is mounted onto the unwinder

2. The barcode scanner confirms which roll (with order block or whole print job) has been mounted

3. Based on scan, information is presented regarding:

   A. Coater adjustments, if necessary

   B. Die selection, if necessary.

   C. Slitter setup, if necessary

   • No adjustments, selections, or setups (above) on a print-job to print-job basis are foreseen for the initial solution

4. The Die-Cut Station is threaded with the length of blank leader provided by the Print Station

   A. Leaving the blank trailer from the previous run threaded through the die-cut station and splicing to it may eliminate the need to rethread for each job.

5. The barcode scanner logs the barcoded reels being used in the 3-up rewinder:

   A. Note is made for each reel regarding the assignment to each 3-up row.

   B Information is retained for later processing with the VSG and the Applicator.

6. 3-up slitter is used to separate order blocks or to re-separate where splices occurred.

7. Barcode scanner is also used to note, either
   • Good, unused orders remaining on input roll, if die-cut processing is interrupted, or
   • Input roll is now empty, OK to reuse
   ❏ As an alternative, may wish to just reprint, instead of working with partial rolls

Verification Points

Print Station - Inspection Station
- Densitometer
  - Print registration
  - Color density
- Subjective print quality
- Barcode scanner to log inspection

Print Station - Rewinder
- Barcode scanner to note spool being used to wind up print job or order block

Post Print-Station / Pre Die-Cut Station Staging (MTC)
- Barcode scanner to identify spools that are off-line, while being staged between stations
- ❏ May possibly just use the scanner that is already intended for scanning the mounted rolls

Die-Cut Station - Unwinder
- Barcode scanner to note spool being mounted for die-cutting
- ❏ Capable for both if a dual unwinder is desired

Die-Cut Station - 3-up Rewinder
- Barcode scanner to note reels being used to wind up slit 3-up rows of print job or order block

Post-Die-Cut Station Staging
- Barcode scanner to identify spools that are off-line, while being staged between stations
- ❏ May possibly just use the scanner that is already intended for scanning the mounted rolls

Error Checking - Pre-Press

Data
- Unrecognized format from Vistakon's order server
- Missing data for template selection or variable data fields
  - Revert to default selection
- Unrecognized template selection
  - Revert to default selection
- Variable data too long for data field
- Duplicate lot number / trail code within print job

Layout
- Print job size may exceed length of whole roll
- ❑ Could report to GUI the length of roll needed to print the job before commencing. This could be done in terms of roll diameter to help the operator load the right roll

Error Checking - Print Station

Print Results
- Densitometer readings are outside of acceptable limits
- Subjective print quality evaluation is "not acceptable"
- Printed barcode has not been scanned yet for densitometer readings
- Printed barcode scan is unreadable
- Printed barcode scanned is not recognized as part of current print job

Rewinder
- Rewinder spool has not been scanned yet
- Barcode scan on spool is unreadable
- Spool scanned is currently in use - not logged as "Empty, OK to reuse"

Error Checking - Die-Cut Station / Off-line

Die-Cut Station
- Unwinder
  - Spool has not been scanned yet
  - Barcode scan on spool is unreadable
  - Spool scanned is not recognized as previously printed roll, ready for die-cutting
  - Spool scanned is currently logged as "Empty"
  - Coater/Die/Slitter setup parameters for spool scanned have not been confirmed (Not needed for initial solution)
  - At end of die-cut run, unwinder spool has not been scanned and logged as, either:
    - Empty, OK to reuse, or
    - Good, unused orders remaining on input roll
- 3-up Rewinder
  - 3-up reel has not been scanned yet
  - Barcode scan on reel is unreadable
  - Reel scanned is currently in use - not logged as "Empty, OK to reuse"
  - Same reel has been scanned for more than one 3-up row

Off-line Printed Spools or Die-Cut Reels
- Barcode scan on spool/reel is unreadable
- Spool/reel scanned is not recognized as empty, printed, or die-cut

Environment

InfoColor 70
- Optimal
  - 20° C (68° F) Minimum with 27 to 62% RH
  - 25° C (77° F) Maximum with 27 to 50% RH
- Acceptable
  - 15° C (59° F) Minimum with 16 to 65% RH
  - 30° C (86° F) Maximum with 27 to 50% RH

Other Environmental Considerations
- Paper storage
  - ❑ 20° C (59° F) Minimum with 27 to 62% RH
    Typo in the Intro & Planning Guide.
    Confirming which it is: 20° C (68° F) or 15° C (59° F) (Bartholet)
  - 25° C (77° F) Maximum with 28 to 53% RH
  - For at least 3 days
- Paper conditioning just prior to printing
  - Same environment as the printer
  - For at least 24 hours before using
- Printed rolls (not coated/die-cut yet), if temporarily staged
- Die-cut label reels (not applied to carton yet), if temporarily staged

Die-Cut Station
- Environmental requirements are much looser than for InfoColor 70
- Die-cut station could be located outside of environmentally controlled room

Electrical Requirements

Pneumatic Requirements

Ventilation/exhaust Requirements

Acoustics

Floor Space

Print Station
- 20.5 feet long by 15.5 feet wide
- Includes InfoColor 70 and all of its peripheral components
  - Native roll feeder
  - Conditioning unit
  - Printing tower
  - Operator console
  - Cooling unit
  - Accumulator
  - Inspection station
  - Cutoff
  - Rewinder
- Includes working and service clearance around all components (about 1 meter)
- Note: During installation, the largest crate is
  216 cm (85 inches) high
  155 cm (61 inches) wide
  167 cm (66 inches) deep
  1292 kg (2849 lb.)

Die-Cut Station
- 30 feet long by 10 feet wide (estimate)
- Includes:
  - Unwinder (dual)
  - Coater
  - UV Drier
  - Accumulator
  - Die-cutter
  - Matrix rewinder
  - 3-up slitter
  - 3-up cutoff
  - 3-up rewinder
- Includes working and service clearance
- ❑ Once the Print Station and the Die-Cut Station have been qualified, IBM will evaluate reduction in floor space.

Control System
- Less than 10 square feet

Throughput

Throughput
- The VSG peak rate is 40 cartons per minute (the demo should be sized for this)
- The initial Demo VSG is only capable of 12 cartons per minute
- The ultimate rate of the VSG is 160 boxes per minute (ignore this for now)

Volume
- Not specified for the Demo
- The order size is 1 to 40 labels
- The maximum print job size (and order block size) will be less than 1 whole roll

Cycle Time
- For the Demo, 2 day cycle from order to labeled carton
- Ultimately, 48 hours from order phone-in to delivered shipment
  (means same day shipment of phoned-in orders)

Up Time

PM Time

Service

Printer

Post Equipment

Control System

Network

Documentation

Spare Parts

Tools

IBM Responsibilities

Post-Equipment Vendor Responsibilities

Vistakon Responsibilities

Supplies

Ordering

Toner

Developer Mix

Toner Waste Bottles

Paper

Varnish

Die replacement (or resharpening)

Technical Support

Printer

Post Equipment

Control System

Network

Supplies

Training

Skills and previous experience

IBM training

Post-equipment training

Reference

IBM InfoColor 70 Introduction and Planning Guide S544-5333-04

IBM InfoColor 70 Paper Selection Guide G544-5386-01

IBM InfoColor 70 Operator's Guide S544-5334-03

Paper Information for IBM InfoColor 70 M0398.DOC

Vistakon Acuvue Toric 12 Pack Carton Blank 10013, Rev E

Vistakon, Johnson & Johnson Vision Products Inc. PQA R-3198

Vistakon

On-Demand, Variable-Data

Label Maker

Functional Specification

Version: 1.1

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C NTENTS

FIGURES

ABSTRACT

The Label Maker project, as configured for Vistakon, is a 2-line, roll-to-roll, label-making solution built around the IBM InfoColor 70 printer. It includes a control system with barcode scanners and operator interface, a label varnisher and diecutter with unwinder, tensioners, accumulators, matrix removal, a 3-up slitter, cutoffs, and rewinders. The control system receives input from Vistakon's Distribution System to create the customized labels with variable data, print the labels 3-up onto rolls, and then the labels are finished onto single-column reels, ready to be applied. Provision is made to inspect the print quality, subjectively and by densitometer, with feedback to the control system. The system creates a data file containing information that confirms the usability of the labels on each reel. The information is passed back to Vistakon's Distribution System to be used by their carton-selecting robot and label applicator to ensure the correct match between label and carton.

INTR DUCTI N

This specification is intended to be a comprehensive definition of a label-making solution to be developed by IBM and delivered to Vistakon. IBM and Vistakon have reviewed prior drafts. This version includes the mutual input from those reviews for the content of a final version. With an accompanying Statement of Work, this specification is the basis of directions for commencement of the work to be done, the description of the solution to be delivered, and the expectations of the functions it will perform.

Changes in scope will be documented by appending mutually agreed Engineering Change Notices.

Organization

This specification is organized, following the introductory sections, by the general areas:

- Descriptions of the tangible output delivered by the solution -- the labels

- The hardware components that produce the labels

- The control system that coordinates the hardware and interfaces with external systems

- The operating processes of the system

- Summaries of checkpoints, error conditions and performance

- Maintenance and Service

- Attachments in hardcopy form that are not imbedded in the softcopy document

Format

This document was created using Lotus Word Pro 97. It has also been converted to a PDF format, readable by Adobe Acrobat Reader 3.0.

BACK R UND

Vistakon, a division of Johnson & Johnson, makes contact lenses. At present they make and package the lenses to plan. They then pick and pack to order. Although procuring preprinted cartons has a considerable lead time, this works when the number of unique cartons for unique prescriptions (Stock Keeping Units or SKU's) is small, and the volume per SKU is high. Vistakon now wants to expand into specialty contact lenses. Specialty lenses require *many* unique prescriptions. This means many more SKU's with unique carton labeling and smaller volumes per SKU. Procuring preprinted cartons to plan becomes impractical. The solution is to print labels on-demand for application to generic cartons as the orders come in.

Vistakon also wishes to seize the opportunity provided with on-demand printing, to go beyond just marking each carton with its contents. Similar to how bank checks are offered, Vistakon wants to provide their customers with a selectable background image to personalize the appearance of each carton of lenses. Also to be printed on each carton label is the name of the eye-care provider (prescribing doctor) or lens retailer, and a custom message. Further, on-demand printing will allow a pre-translated caution statement to be selected for each customer's own language, eliminating the need for multiple repetitions.

A high degree of reliability and verification is required for this solution. What is printed must be accurate, the post-printing finishing must be defect-free, and the ability to apply the correct label to the right carton must be ensured. To accomplish this, verification points throughout the process will provide checks for print quality (both subjective and machine scanned), barcode identification of individually printed labels (to identify location, pick ticket, reel or spool), and post-printing finishing quality. Vistakon's Distribution System will be notified to continue processing only the labels that have passed the quality verification. Vistakon will be able to resubmit labels that may have become unusable.

ASSUMPTIONS / SCOPE

Assumptions:

1. Vistakon will supply the pick tickets in batches to the Label Control System.

2. Vistakon will inform the Label Control System when each reel has completed the applicator process and is empty. This may be an operator action.

3. The Label Control System will not directly access data on any other system; rather, it will expect the data to be located in a common or shared location.

4. Vistakon will provide pick ticket entry simulation during testing.

5. Requests to reprint a pick ticket will not be received until after the Label Control System has either
   A. been notified that the reel containing the previously printed version of the pick ticket is empty, or
   B. been notified that the labels for the pick ticket are unusable.

6. Vistakon will manage and provide all image files with the canned images on the labels.

7. A barcode produced by the Label Control System for tracking will appear on the labels using Code 128. The barcode will include the pick ticket number.

8. Spool and reel cores that are used for winding the InfoColor 70 output and the finished labels will have a unique identifier within the Label Control System while in use. This identifier can be scanned or typed by the operator when mounting or dismounting .

9. System backup and recovery for the files and database should be handled using standard operating system (AIX) or DB2 procedures; there will be no built-in function in the Label Control System to perform these functions.

10. The final label material selection will be from the InfoColor 70 qualified list. A joint effort by IBM and Vistakon will determine the choice. The label material manufacturer/supplier will also be consulted in final material choice.

11. Vistakon will provide a hardware and a software person in Boulder for the qualification period to participate and validate results and to become familiar with the system for the purpose of operating it.

12. Vistakon will provide the necessary environment for installation: floorspace, temperature, humidity, electrical, pneumatic, ventilation, network cabling, adapters from 10 base to 100 base.

13. A label applicator can be designed to apply labels from a reel that has the characteristics described in this specification.

14. Each pick ticket will be small enough to fit in one column of labels produced by a single print job, and in any case will not exceed 1,296 labels (2 digits in base 36). A pick ticket will not be split on different columns.

15. Labels for any pick ticket are considered either all usable or all unusable.

16. The printed content for all labels for a pick ticket will be the same with the exception of the barcode.

17. NFS will be used for sharing files between the Label Control System and Vistakon's Distribution System. This means that Vistakon will need to ensure that NFS software compatible with AIX NFS is installed on systems which will be communicating with the Label Control System.

In Scope:

1. This solution provides reels of color-printed, varnished, 1-up labels ready to be applied, along with data about which pick tickets are usable and unusable on the reel to Vistakon's Distribution System.

2. There is only one label shape and size and only one layout pattern for the web.

3. Each Label Control System will be accompanied by only one Print Line and Coat-Cut Line for tracking.

4. IBM will integrate and qualify the solution at Boulder prior to installation at Vistakon in Jacksonville.

5. IBM will provide operator training for the solution, with participation from the non-IBM equipment vendors.

6. Solution performance that is demonstrated with simulations for pick ticket entry, rework feedback, and VSG/applicator data will be sufficient.

Out of Scope:

1. This solution as presently defined does not apply the labels.

2. Flexibility to add more than one label size, shape, image and text is considered in the present design. However, the effort to add a new layout to the system, the modifications to diecut and slit, and the validation of a new layout are not included in this initial installation.

3. This solution will not be configured to print directly on carton material or on metal foil.

4. This configuration will not be in-line. It will be a Print Line plus a Coat-Cut Line.

5. The Label Control System will not have direct access for checkpoint status information within the Coat-Cut Line. The tracking provided will be at the spool and reel level, as initiated by the operator.

6. The Label Control System will not track VSG picking and label applicator processes.

7. The label reels that are produced will not necessarily be "perfect". That is, there may be extra space, or blank or unusable labels between one usable label and the next. However, the data file provided with each reel will detail the pick tickets, their status, and sequence to Vistakon's Distribution System for the applicator's and VSG's use.

REQUIREMENTS

Label Material:

MEDIUM

The print medium is to be white, label print stock:

* Continuous web in roll form. Splices are not permitted; they could interfere with printing, diecutting, matrix removal, and label application. Temporary splicing, performed by the operator to facilitate loading and threading operations, are permitted and are advised to both simplify threading and to minimize necessary lengths of leader and trailer material.

* Edges that are pinless; that is, no tractor-drive holes. This must not be taken to mean that tractor holes are merely not needed. Tractor holes are not permitted for use in the InfoColor 70 printer. Creating tractor holes in the web after passing through the InfoColor 70 would be permissible, if needed for any post-printing processing. However, no need for this is anticipated for the configuration of this system.

* No perforations, either in the face material or the liner material. They are not needed, as the system configured provides for label creation and matrix removal without them. And they could interfere with processing through the system.

* No precuts in either the face or liner. The system configured will generate the cuts necessary. Precuts could interfere with operation.

FORMAT

The physical format for the material is:

* 320 mm (12.6 inch) maximum web width. This is the maximum width possible that will feed through the InfoColor 70. Using this maximum width material will provide for the maximum possible print width. The layout of the label print jobs will be designed to make the most use of the maximum material width.

* 500 mm (19.7 inch) maximum diameter (about 88 pounds). This is the maximum diameter accepted by the unwinder that is built into the InfoColor 70. Vistakon has indicated that this unwinder is sufficient for their usage. A change in the requirements for input unwinder can be evaluated.

* 6 ± 0.020 inch (US) core diameter for input to the printer.

See the referenced Paper Selection Guide for more information including wrapping, shipping, storage, and environment.

Material Source:

IBM will recommend to Vistakon the label material to be used for this solution. The material will be selected based on several factors:

- Materials to be considered will be from the list of pre-qualified materials for the InfoColor 70. See the referenced Paper Information.

- Appearance. Since the label will be applied to 3 sides of an existing carton, it is to be matched in appearance to the remaining, exposed sides of the carton. The selection of varnish will also affect the appearance.

- No show-through of printing on the carton beneath the label

- Print Quality for this application.

- Compatibility with post-printing processes (IBM and post-vendor responsibility)

- Adhesive permanence (Vistakon responsibility)

- Price

- Cyto-toxicity (Vistakon responsibility)

CANDIDATES

Several materials have already been sampled as candidates. At present, the preferred material is:

- 3M:

  - #7841 Matte
    Face: 7.0 mil Teslin Polyolefin
    Adhesive: 0.8 mil
    Liner: 3.2 Paper
    Total caliper: 11.0 mils

SELECTION

IBM and Vistakon have sample pieces and spec sheets of the materials. See Attachments for Label Material Manufacturer Spec Sheets. A test roll has been received by IBM for the preferred candidate. Test labels will be printed on IBM's InfoColor 70 using a sample label file simulating Vistakon's labels. Printed rolls will first be evaluated for print quality and for any operational considerations during printing. They will then be sent to the post-printing finishing vendor for further evaluation. This will include:

- Varnishing and UV drying
- Diecutting
- Matrix removal
- Slitting

Final selection of the label material will be made from results. The selection process needs to be determined.

Varnish:

The primary purpose of a coat of varnish over the label's printing is to protect it from removal or smearing. The criterion will be:

- Sutherland rub test using a 4 pound weight at 100 strokes with no removal or smearing of toner (IBM responsibility)

The varnish will also be selected and applied to produce a gloss appearance to match the part of the carton that is not covered by the label. Vistakon has provided sample cartons that represent the appearance to be matched.

The post-printing finishing vendor will participate in both the label and the varnish material selection, testing, and evaluation. The UV varnish may not contain carcinogens, mutagens, etc., and must be approved by Vistakon Safety, Industrial Hygiene, and Environmental department. The selection process needs to be determined.

Label Format:

For the initial Vistakon configuration, just one size and shape label is required for demo purposes. The requirements for the label are:

- To fit around three sides of the assembled carton. See Carton Specs below.

- To have one corner of the label cut out to allow the carton's preprinted barcode to remain uncovered.

- The dimensions should be the maximum allowable, yet still avoid having a label edge protrude past a carton edge after the label has been applied.

- Vistakon has indicated a nominal label undersize of 1/16 inch all around is acceptable.

- The printed background image will extend beyond the diecut, including allowance for all tolerances.

- The printed foreground images will maintain a margin with respect to the diecut, to allow for tolerances.

CUT LABEL DIMENSIONS

To fit the carton the following cut label dimensions are presently being proposed:

- 98.5 mm (3.88 inch) long (around 3 sides of the carton)
- 76.2 mm (3.00 inch) wide
- The label's corner cutout will be determined based on the location, size and tolerances of the printed barcode on the carton. This information has not yet been provided.

Testing with the selected label material and sample cartons will determine the final dimensions. Vistakon will confirm the dimensions of the folded carton to be used and will verify the final dimensions of the label.

PRINTED LABEL AREA

For the printed image area, the background image will be oversized to allow for diecutting tolerance:

- ± 0.25 mm (0.010 inch) with respect to the printed registration mark
  See Label Content - Off-Label below for information on this mark.

This will ensure that the background image always extends at least to the diecut on all sides, with no unprinted areas showing around the edges of the cut label.
The layout of the foreground images will keep them distanced from the diecut edge at least an equal distance to ensure that the diecut does not crop any of the foreground images.
Testing with the selected label material and die will determine the final print dimensions.

CORNER RADII

The corners of the labels must have adequate radii to:

- Allow for die manufacture
- Allow for clean diecut operation
- Prevent a starting point for matrix tear during removal (outside corner)
- Prevent a starting point for peel-up after application (outside corner)
- Prevent a starting point for label tear during application (inside corner)

In general, the larger the radii, the less concern for all of the above items. To balance with aesthetics and image layout, 3.3 mm radius is presently being proposed.
Testing with the selected label material and die will verify the final radii.

Web Layout:

See the Label Layout Attachment.

The labels for the present configuration are printed 3-up across the web. Future configurations may mean fewer or more columns of labels across the web. The label orientation is presently the long dimension across the web to take fullest advantage of maximum web width. This will provide the most number of labels per running foot of web possible. This was done keeping the following parameters in mind:

LABEL SPACING

- The minimum spacing between diecuts across the web is 4.5 mm (0.18 inch). This corresponds to the distance between cut labels, and is a result of laying out the labels 3-up across the web and using the maximum print width available.

- The minimum spacing between diecuts along the web is 6.4 mm (0.25 inch). This is the spacing between cut labels along the web.

- The spacing from the cut edge of a label to the adjacent edge of liner is 2.3 mm (0.09 inch). This is equal to half the space between the labels and is a result of the label layout across the web.

WEB MARGINS

See the Label Layout Attachment.

The print width rules for the InfoColor 70 are:

- The full print width for the Model 02C is 305 mm (12.0 inch).

  Therefore, if using the maximum width web of 320 mm (12.6 inch), the equally divided edge margins are:

  (320 mm - 305 mm) / 2   =   7.5 mm (0.3 inch) web edge to print edge margin

  Allowing for the 0.25 mm diecut-to-print tolerance, the outer label cuts will be:

  7.5 mm + 0.25 mm   =   7.75 mm (0.305 inch) web edge to diecut edge margin

  Assuming the cut label dimension of 98.5 mm, and 3-up printing, the resulting cut spacing between labels is:

[320 mm - (2 x 7.75 mm) - (3 x 98.5 mm)] / 2   =   4.5 mm (0.177 inch) matrix land .

- .For less than the maximum paper width,. the edge print margin is:
  .5 mm (0.2 inch)

PAGE LENGTH

The page length, for purposes internal to the printing process only, will be three printed labels. This will also match the multi-cavity die layout and will equal the indexing length for web advancement for each diecut stroke. Assuming the label is 76.2 mm wide with 6.35 mm spacing, the page length is:

(3 x 76.2 mm) + (3 x 6.35 mm)   =   247.7 mm (9.75 inch) page length

Label Content:

The printed content of each label will be comprised of the following.

Front of carton:
- A background image
- Johnson & Johnson logo, Acuvue logo
- 2 lines of ECP-associated text
  - ECP name
  - Additional line of text

Side of carton:
- Caution text image
- Label Control System's Barcode

Back of carton:
- Pick-ticket level text

MASTER LABEL PAGES

The label images will be assembled always starting with a master label page that consists of 9 labels with all constant data for a print job. The constant data is the Johnson & Johnson and Acuvue logos which will supersede the background image under them. This includes blank labels to even out the lengths of 3-up columns and test-pattern labels for diecut setup.

For printing, the pick tickets will be grouped by common Master Label Pages. Those with the same background image will be grouped and printed together. Therefore, the printing order will not necessarily be first-in-first-out with respect to the order in which they were received by Vistakon's Distribution System.

BACKGROUND IMAGE

Vistakon's requirements for the initial configuration and demo has been estimated by Vistakon to be about 10. These images would be supplied by Vistakon. Vistakon's requirement is to be able to vary the selection of background images from pick ticket to pick ticket, but not from label to label with any one pick ticket. These backgrounds would be selectable to customize the labels' appearance for each pick ticket. The Control System will have the capability for storing multiple background images, from which selecting one at the pick ticket level is possible. See the Control System below for details.

The background image may consist of a combination of one or more of the following, as examples:

- Photographic or drawn scene, which can be scanned in.
- Logos, brands, graphics, or text, created with graphics tools.
  Trademark colors for logos must be provided by Vistakon.

ECP TEXT AND PICK TICKET MESSAGES

On the front of the carton, foreground text is intended to supersede those portions of the background image that they coincide with. The foreground text locations must be planned along with any important components of the background image, such as logos, brands, or text, to avoid the possibility of obscuring them. Vistakon's requirements for the initial configuration and demo is that the foreground text be variable from pick ticket to pick ticket, but not from label to label within any one pick ticket.

The Control System will have the capability for accepting variable text messages for the pick ticket. Depending on the provision for space for such text, the messages will have some length limit. The text will use an ASCII code page. There will be no provision to accept double-byte variable data text such as Kanji.

Examples of Text at the Pick Ticket level:

- Text information pertaining to the ECP (many possible) such as:

  - Name, office
  - Address
  - Phone Number

  Text length will need some limit to fit in a maximum space allowed.

- A standard caution text previously composed and translated into different languages. Vistakon has estimated the number to be about 20.

At the Label level:

Vistakon has no requirements for the initial configuration and demo to vary any label content from label to label within any one pick ticket. The ultimate desire, however, would be to print unique text on each label. This text would be aimed at the individual patient associated with each label such as:

- Unique instructions for the patient
- Individual appointment information
- Any message the ECP/Retailer wishes tailored, based on a profile of the patient

ADDITIONAL LABEL CONTENT

To track and control the process of printing and finishing the labels, IBM requires that its Control System create and print a unique barcode on each label. It is anticipated that this barcode will also be needed to ensure the correct match of label to carton in a label applicator. This barcode will be generated by the Control System. It is not intended to equal the lot number of any lens carton, but the Control System will provide the numbers as part of the output file with the finished labels. The code will be a combination of Vistakon's pick ticket number and an IBM tracking number. The barcode is:

- 10 characters, 1 inch long total and 0.25 inch high, with sufficient quiet space around it
- Black on white, Code 128 format
- Bars only, no human readable characters
- Placeable anywhere on the label by mutual agreement. On the small, middle panel (of the 3 carton sides that the label covers) is suggested.

Neither the need for, nor the specification of, a registration mark on the label for a label applicator has been determined at this time. If at a later time, a need is determined IBM will work with Vistakon to add a mark to the label.

ADDITIONAL CONTENT - OFF LABEL

IBM requires printed registration marks off the label to permit the diecutter to align the die with the printed labels. Marks will be printed for each page of nine labels. These marks will be removed with the matrix by the Matrix Removal process. See the Diecutter Registration Mark Attachment.

As part of the startup and print quality adjustment procedures, IBM also requires that test patterns be printed prior to printing a label print job.

A Control Strip for the InfoColor 70's densitometer can be included on each page (9 labels) for all print jobs on a spool. This would increase the length of each page by the width of the Control Strip, requiring a corresponding page size adjustment for the diecutter.

Carton Specs:

Vistakon has provided samples of the carton for which these labels are intended. Samples include both folded and printed, and unfolded and unprinted. Vistakon has also provided carton samples, that although are a different size and shape, represent the desired gloss to be matched by the label.

Vistakon has provided an engineering drawing of the unfolded carton. See the Carton Engineering Drawing Attachment. No specification has been provided for a folded carton. Printing specs are needed for the location and size of the barcode information preprinted on the carton. IBM and Vistakon will mutually agree on the size and shape of the label to best fit the folded carton.

PRINT AND C AT-CUT LINES

Print Line:

See the Print Line Layout Attachment.

INFOCOLOR 70 - MODEL 02C:

Unique configuration for this application:
- Reconditioned. Components that may have become worn from prior usage will be replaced. All software and hardware will be to the current InfoColor 70 level.

- Includes a 64 GB collator

- Includes a densitometer for semiautomatic adjustments to:
  - Print registration
  - Color density

- Will use the built-in roll feed instead of a separate unwinder
  - 500 mm (19.7 inch) maximum diameter roll capacity
  - Includes lift-assist device

- Since this solution prints roll to roll
  - The sheet cutter will be disabled or removed
  - The stacker will not be installed

- Since this solution only prints labels, duplex printing will be disabled. On the duplex side of the web, the photoconductor drums will still be engaged and turning, but only to support the web. The drums will not be functional. The developer mechanisms will be present but will not be engaged with the drums. No consumables will be used by the duplex side.

For additional specs:
See the referenced Introduction and Planning Guide, Paper Selection Guide, and Operator's Guide.

ACCUMULATOR

Functions:
- Senses the presence of label material exiting the printer to drive the rewinder to take up the slack.

- Collects the output of the printer when there is a need to stop the paper at the inspection station (for example, to sample the print and make print adjustments without stopping the printer).

Design specifics:
A bin capable of accumulating 76 m (250 ft) of 12.6" wide label material; sensing devices capable of detecting the presence of label material in the bin; weight: 100 lb.

Note: The accumulators for both the Print Line and Coat-Cut Line have the same capacity in feet of web material, however the maximum accumulation time is dependent on the process speed and will be different for each line. The accumulators for the print and Coat-Cut lines are not the same make and models.

INSPECTION/CUTOFF STATION

Functions:
A platform that supports print sampling, print adjustments, pick ticket/job acceptance/rejection, and web cut activity by the operator. The operator will be able to periodically stop the paper at this station, by stopping the rewinder; take density measurements, registration measurements and do a subjective visual inspection of the print image; initiate reordering the pick ticket/job if there is a print defect by identifying a label with a bar-code scanner; and cut the paper to end a job or separate them.

The expected frequency of checks is once per roll of paper, prior to printing the labels. Each check may actually consist of several inspections in an iterative process to achieve the desired results. The capability is provided to make as many checks, even during label printing, as the operator wants to satisfy the threshold of acceptance. Additional checks are recommended following any operator maintenance.

Design specifics:
A platform approximately 0.75 m high, 0.6 m long, and 0.4 m wide.

REWINDER

Functions:
Rewinds the printed label material on a reusable spool that has a unique identifier for control/tracking purposes. The number of reusable spools will be equal to the expected number of rolls produced per day plus one. The spool identifier can be as simple as a number written on the spool with a marker or it can be a barcode label. The identifier can be typed in by the operator. If a barcode is used, IBM will provide the barcode labels that are used for the initial spool cores. The labels and cores are intended to be durable and reused. Barcode labels for additional spools are yet to be arranged; this label-making solution will not generate them. Barcode 128 should be used with a maximum of 10 characters per barcode. The identifiers must be unique for each spool.

The rewinder can be stopped by the operator for print sampling purposes. When active, the rewinder responds automatically by sensing the presence of paper in the accumulator and rewinding the paper to take up the slack.

Design specifics:
Max. roll diameter: 22 inch; Max. roll width: 14 inch; Power req.: 200-208 VAC 60 Hz 20 Amp; 25 - 100 feet per minute

ROLL HANDLING CART

Functions:
A mechanical assist that allows an operator to remove a roll of label material from the Print Line Rewinder, roll it across a flat surface to the Coat-Cut Line and install it on the unwinder without the operator having to carry the weight of the roll.

Design specifics:
Max. roll diameter: 22 inch; Max. roll width: 14 inch; Max. roll weight 88 lb.

Coat-Cut Line:

See the Coat-Cut Layout Attachment.

DUAL UNWIND/SPLICE STATION

Functions:
Unwinds the printed roll and facilitates changing printed rolls by using two spindles and a splicing station.

Design specifics:
Weight: 500 lb. (not including roll weight); Power Req.: 120 VAC 60 Hz 15 Amps; Air req.: 80-100 psi at 0.5 cfm; Max. roll diameter: 30 inch; Max. roll width: 20 inch; Max. roll weight: 500 lb.; Max. speed for 3 inch core 127 feet per minute

VARNISH/CURE STATION

Functions:
Applies a high gloss, scratch-resistant coating across the width of the paper using a doctor-bladed system. The coating is then cured using a single cartridge UV curing unit.

Design specifics:
Doctor Blade varnishing design; 400 Watt single-cartridge UV curing design; varnish thickness: 0.0001 to 0.00025 inch; Power Req.: 120 VAC 60 Hz 10 Amps; weight: 255 lb.; Air req.: 80-100

psi at 0.5 cfm; Varnish material to be determined. Ducting to outside air will be a site requirement. A fume evacuator will be included as part of the UV curing unit.

ACCUMULATOR

Functions:
Collects the output of the varnisher to facilitate making any changes or adjustments at the diecutter, matrix rewinder, slitter, or rewinder without stopping varnish/cure operations.

Design specifics:
A bin capable of accumulating 76 m (250 feet) of 12.6 inch wide label material; sensing devices capable of detecting the presence of label material in the bin; weight: 95 lb.

Note: The accumulators for both the Print Line and Coat-Cut Line have the same capacity in feet of web material, however the maximum accumulation time is dependent on the process speed and will be different for each line. The accumulators for the print and Coat-Cut lines are not the same make and models.

DIECUTTER

Functions:
Cuts only through the face material layer of the web to form the labels using a platen press. The web is indexed a preset distance and the die is registered to a printed registration mark using a fiber optic registration system before cutting the labels.

Design specifics:
Platen press design; inbound and outbound roll feed of label material; fiber optic X and Y registration system (see attached drawing for registration marks specifications); quick-change, precision die mounting; platen size: 13 x 20 inch; cut depth: adjustable to 0.001 inch; weight: 3500 lb.; power req.: 220-240 VAC 1 Ph 60 Hz 40 Amps or 440-480 VAC 3 Ph 60 Hz 20 Amps; air req.: 80-100 psi at 3-4 cfm; estimated die life is 0.5 to 1.5 million impressions. Shock load to the floor is less than 2000 lb. for a duration greater than 50 milliseconds.

MATRIX/SLIT/REWIND STATION

Functions:
- Waste Matrix Rewinder: Removes the matrix around the labels from the liner material and winds it up using a power spindle for disposal.

- Fixed position slitter: Slits the web into three strips to separate the three-up labels into single columns of labels. Also used to trim off the outer edges of the web. The slitter blades can be moved to any position in the web path, but it will require tools and is considered a service procedure and not an operator task.

- Manual cut station: Facilitates cutting the web just before the rewinders.

- Three Spindle Rewinder: Simultaneously rewinds each column of labels onto separate, reusable cores that have unique identifiers for control/tracking purposes. The number of reusable reels will be equal to the expected number of rolls produced per day plus one. The reel identifier can be as simple as a number written on the reel with a marker or it can be a barcode label. The identifier can be typed in by the operator. If a barcode is used, IBM will provide the barcode labels that are used for the initial reel cores. The labels and cores are intended to be durable and reused. Barcode labels for additional reels are yet to be arranged; this label-making solution will not generate them. Barcode 128 should be used with a maximum of 10 characters per barcode. The identifiers must be unique for each reel. The finished product of this system are single columns of labels rolled up on reels.

Design specifics:
1 matrix remover/rewinder; 4 slitting blades; 3 label rewinders; weight 700 lb.; Power Req.: 120 VAC 60 Hz 15 Amps for label rewinders; Air req.: 80-100 psi at 0.5 cfm; Max. roll diameter: 30 inch; Max. roll width: 20 inch; Max. roll weight: 500 lb.; Max. speed for 3 inch core 127 feet per minute; estimated slit blade life: 5 million feet

COAT-CUT CONTROL SYSTEM

Function:
Provides control and operator interface for the entire Coat-Cut Line. Software is included that will respond to a polling request (ASCII string set) via the Ethernet LAN and send the following:
   a. Current run job indicator
   b. Current production rate
   c. Production history (last 12 hours)
   d. History of unprinted material
   e. Faults
      1. Matrix rewind full
      2. Materials supply low
      3. End of line splice detector
      4. Low varnish supply

See Coat-Cut Controller Attachment.

Design specifics:
IBM compatible Industrial PC, 19 inch Rack mount; Elotouch Touch screen (SAW technology) on a 15 inch VGA monitor.

CONTROL SYSTEM

Overview:

This document provides a specification for the Label Control System software and hardware. The specification includes: a list of requirements that define the processing the system will perform, the interfaces to the system and the computing environment that will be needed to support this system.

The Label Control System software will control and track pick tickets through the printing and post processing steps until notification that the reel of labels has been applied to cartons.

Processing Requirements:

Software and operator user interface specifications are contained in other sections of this document.

1. Pick tickets will be generated by Vistakon's Distribution System. The distribution system will not be available during the development of the Label Control System so a simulator will be used during development and test of this system. The interface between the distribution system and the Label Control System is defined in this document.

2. Pick tickets will contain all information needed to identify the associated order in the Vistakon Distribution System, and to create all the labels for the order, including: the selections from a set of images and text; the actual content for additional variable text.

3. The set of images for label backgrounds, photos or canned text will be provided as encapsulated PostScript (.eps) files to the Label Control System by the customer.

4. Errors in pick tickets received by the Label Control System will be communicated back to the Vistakon Distribution System.

5. The Label Control System can print test labels for setup of the Coat-Cut line. This would typically be a few pages at the end of a printed roll. After mounting to the Coat-Cut Line, the test labels would be leading the roll. The operator can select the number of test labels desired.

6. For the initial demo configuration, all labels have the same size and layout.

7. If there is an unusable label in a pick ticket then the entire pick ticket is considered unusable.

8. Requests to reprint the labels for a pick ticket will come from Vistakon's Distribution System. The operator will indicate the failure and select or enter an associated cause for the unusable pick ticket. For a pick ticket damaged by the printer or coat/cut station during manufacturing, Vistakon's Distribution System will resubmit for reprint as soon as the printer is available. For other areas where labels are damaged Vistakon's Distribution System will resubmit at an interval to be defined by Vistakon.

9. Labels will be printed three up. This will result in three columns of output from the printer. When the number of labels in each column are not equal, blank labels will be printed to fill.

10. Each page of labels will have alignment marks printed for the Coat-Cut process.

11. These three columns of output will be coated, diecut and slit into three reels of labels. The Label Control System must track the location of a label on the spool from the printer and on the reels from the slitter.

12. When an unusable label is found, the operator can specify that labels in the two columns adjacent to the unusable label will also be considered unusable. Because the printer prints across the three columns at one time, in most cases if one of the labels has a print quality error the labels that were printed at the same time will also have the error.

13. If an entire spool of output from the printer, or reel of output from the slit process is found to be unusable, then all the labels on the spool or reel will be considered unusable.

14. After slitting, the Label Control System will provide information about the pick tickets on each reel, including which pick tickets have unusable labels.

15. After the labels are applied to cartons, Vistakon's Distribution System will communicate back to the Label Control System that the reel is empty.

16. The spools and reels themselves will have an identifier that will be used by the Label Control System in tracking the printed labels.

Computing Environment:

The following diagram shows the basic elements of the label control system including a network, the external system interfaces, and the control system hardware.
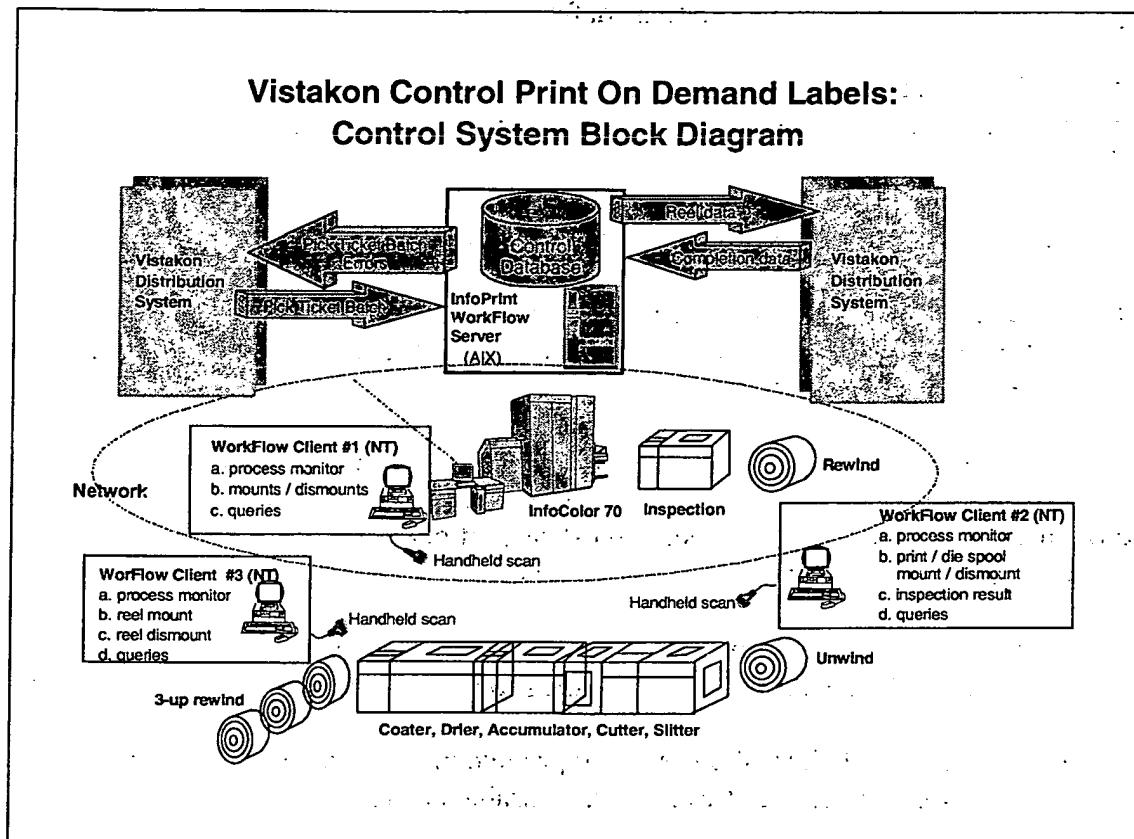
Fig. 1. Control System Block Diagram

A typical flow through the control system is:

✓ Batches of pick tickets are received from Vistakon's Distribution System

✓ Pick tickets are loaded to data base

✓ Print Job(s) are created

✓ Print Job(s) are submitted and tracked in data base

- Empty spool is mounted on Print line rewinder for print jobs (type in or scan the spool ID)
- InfoColor 70 prints job onto rewinder
- Inspection station is used to enter usable/unusable status (scan label)
- Loaded spool is dismounted from Print line rewinder

- Loaded spool is mounted onto Coat-Cut unwinder (type in or scan the spool ID)
- Empty reels are mounted onto Coat-Cut rewinders (type in or scan the reel ID)
- Print job is unwound, coated, cut, slit, and rewound
- Loaded reels are dismounted from Coat-Cut rewinders

✓ Reel data is sent to Vistakon's Distribution System

The following is a list of descriptions of each computer hardware in this system. The detail of the functionality will be addressed in the section of software components.

InfoPrint WorkFlow Server: provided by IBM
This is the Label Control System server that provides central control for entire system.

- Platform: IBM RS/6000 Power PC, model 43P
- Operating system: IBM AIX 4.3 (IBM's version of UNIX)
- Interface hardware: Ethernet with 100 Base
- Software installed: InfoPrint WorkFlow server, DB2, InfoPrint Manager

See the "InfoPrint Software" attachment for a description of the InfoPrint software components.

See the "AS/400 Connectivity" attachment for a description of how the Label Control System can communicate with an AS/400, if desired.

Three InfoPrint WorkFlow Clients: provided by IBM
These InfoPrint WorkFlow clients will be used to monitor the status of the printing process, provide entry of the results of label inspections, notify the control software of actions the operators have taken, and to update system information. Each client will consist of:

- Platform: IBM PC
- Operating system: Microsoft NT 4.0
- Memory: at least 48M
- Disk space: at least 2G
- Monitor Display: at least 17 inch
- Interface hardware:
   1. Ethernet with 100 Base
   2. Manual Barcode scanner
- Software installed: InfoPrint WorkFlow client

Ethernet hub(s) for the Label Control System

- These hubs will be used for a local network. Connections to the Vistakon network are not provided.

Label Control System Flow:

The Label Control System server takes new batches of pick tickets and manages them from receipt to application of the labels on the cartons. Processing includes generating print jobs for the InfoColor 70, tracking printing, tracking post processing, generating a reel data file, processing reel results and responding to the InfoPrint WorkFlow client. DB2 is used by InfoPrint WorkFlow for storing information about: pick tickets, print jobs, and other items. The InfoPrint WorkFlow client is used by an operator to record information about which spool or reel is in use and to record quality problems with labels. Reports, showing the processing of the system, are displayed on the InfoPrint WorkFlow client.
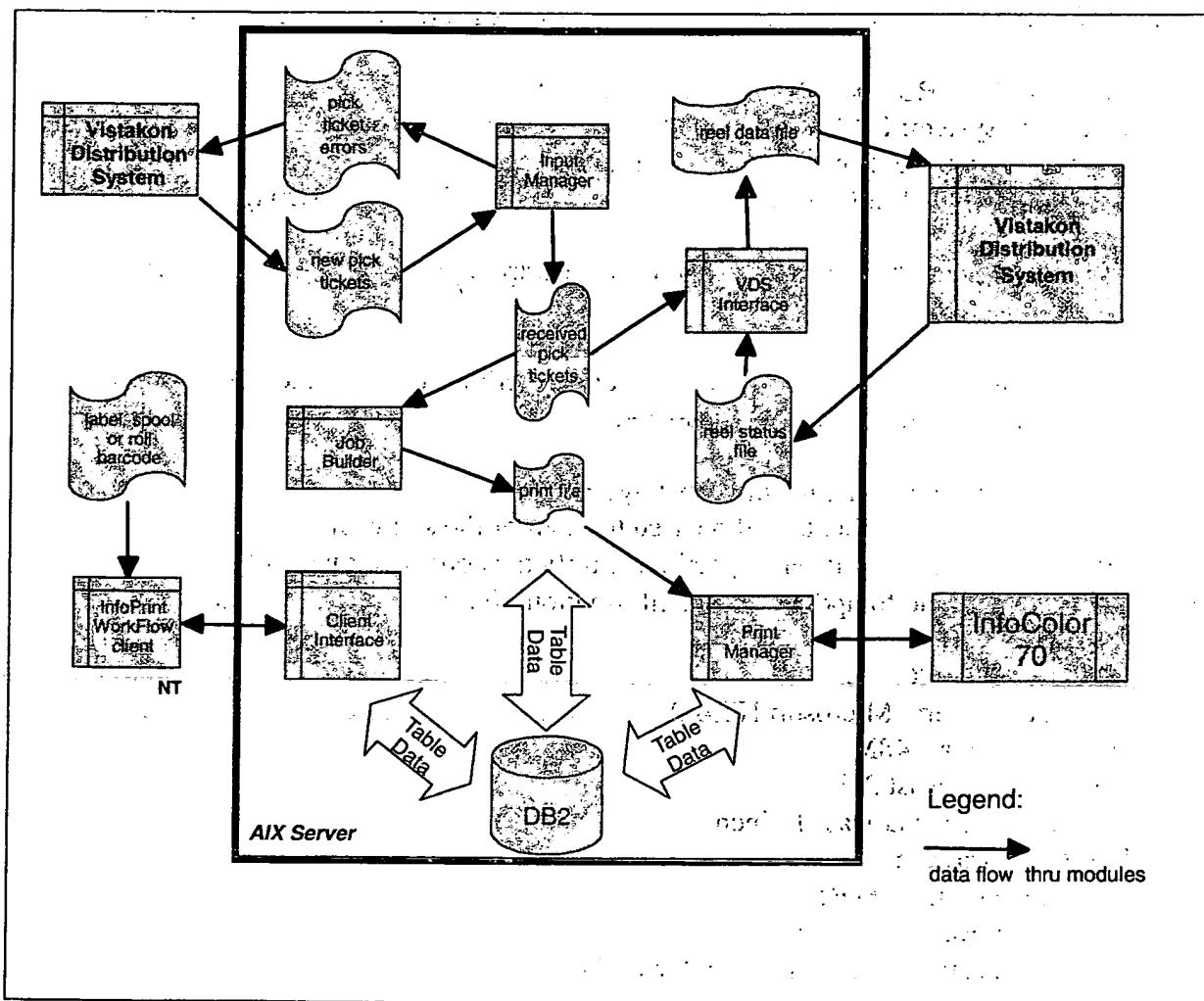
Fig. 2. Label Control System Flow

The basic steps in processing are:

1. The Vistakon Distribution System places a batch of pick tickets into a directory on the Label Control System server.

2. An entry is made in the database for each pick ticket in the batch.

3. New print jobs are generated to print all the labels needed for the pick tickets in the batch.

4. The print jobs are submitted for RIP and hold.
   • The operator mounts a spool and identifies it using the InfoPrint WorkFlow client.
   • Print jobs are released and tracked through printing.

5. Once a pick ticket is printed it is associated with the physical spool on the Print line rewinder. The operator does this by entering the spool identifier or scanning the barcode of the spool mounted on the rewinder.

6. When the spool is full the operator will dismount the spool.

7. When the spool is ready for the Coat-Cut process the operator will mount the spool and 3 output reels.

8. When the Coat-Cut process has finished, the operator will use the InfoPrint WorkFlow client to notify the system of the input spool and output reels so that it can associate the pick tickets with the appropriate reel.

9. The Label Control System will generate pick ticket status information for each of the reels.

10. When the applicator has finished its processing the Label Control system is notified. This will mark empty reels available, record statistics, and begin the retention period for cleaning up.

11. Successfully completed pick tickets and their associated information will be deleted after the configured retention period.

Software Interfaces:

The Label Control System interacts with Vistakon's Distribution System and with the operator. The following sections define the interfaces that will be provided in each of these areas.

Note that, since the Label Control System runs on AIX, the file system is case sensitive. All software must use the same case when referencing a file in order for the file to be found. The Label Control System will use lower case letters in file names unless otherwise noted.

VISTAKON'S DISTRIBUTION SYSTEM INTERFACE

Vistakon's Distribution System will communicate with the Label Control System through a directory that is accessed by both the Label Control System and Vistakon's Distribution System. The directory will contain: new batches of pick tickets from the distribution system, pick ticket batch error files from the Label Control System, reel data files from the Label Control System, reel status files from Vistakon's Distribution System, and reel list file from the Label Control System.

New Pick Ticket Files

Each batch of pick tickets will be placed in a separate file in the directory. The name of the file will be the batch id with an extension of ".batch".

Each batch must have a unique file name.

The .eps files referenced in the pick ticket must have been placed in the system before the new pick ticket batch file is placed in the directory.

Pick Ticket Batch Error Files

A pick ticket batch error file is generated when the Label Control System receives a new pick ticket file and finds a problem with the file. When a pick ticket batch error file is generated the pick tickets in the batch will not be added to the Label Control Systems database and so will not be printed. The distribution system must generate a new, valid pick ticket batch file for the pick ticket batch to be accepted and have labels printed.

The name of the pick ticket batch error file will be the same as the pick ticket batch file name but with an extension of ".error".

Possible Error conditions include:

- Unable to read file
- Unable to rename file (file is renamed after reading contents so it will not be picked up again)
- Invalid pick ticket ID
- Invalid pick ticket label count
- Pick ticket name is not unique (Label Control System already has an pick ticket with this name)

Vistakon's Distribution System is responsible for watching for pick ticket batch error files and handling the errors. It must delete the pick ticket batch error files before resubmitting the batch for printing.

Image Files

Image files that are referenced by new pick tickets must have unique names. The management of image files such as adding and deleting is performed manually using system file functions.

IBM will provide information to Vistakon so that it can correlate the barcodes on the printed labels with order numbers and determine which pick tickets have labels that are usable. Vistakon's Distribution System will also receive this information to pick the cartons in the proper sequence to match the labels that are on the reel. In addition the Label Control System will receive information back from the applicator process indicating that a reel of labels has been emptied.

The communication of this information will be through a directory on the Label Control System where the applicator process has write access. Until the applicator process or a simulator is available to create an applicator results file, the operator will be required to initiate a transaction to provide the results to the Label Control System.

Reel Data Files

These files are generated by the Label Control System when the Coat-Cut and slitting process for a reel has finished. If after this process an operator uses the InfoPrint WorkFlow client to identify any additional unusable labels on the reel then the file will be regenerated with the new information.

The barcode for a label will consist of 10 characters. The first 7 characters will be the pick ticket name encoded in base 36. The eighth character will be the reprint number for that pick ticket. The reprint character starts at 0 and will increment through 9. If additional reprints are needed then the characters A through Z will be used. This allows up to 36 reprints per pick ticket. The last two characters are the label number within the pick ticket. The number will be encoded in base 36 using the digits 0 through 9 and characters A through Z as is done with reprint. (Label 35 would have "0Z" as its last two characters and label 36 would have "10" as its last two characters). This allows up to 1,296 labels per pick ticket.

The name of the file is the reel's ID with an extension of ".data". Any other labels found on the reel should not be applied to cartons.

Reel List Files

This file contains a list of the reels which have been generated. Reels are removed from the file after the Label Control System has been notified that they are empty.

Reel Status

Applicator results must be provided to the Label Control System to close out pick tickets, to make reels available for loading new labels and logging statistics.

In the event that no reel status is available, the operator will have an interface to declare the reel completed and available for loading. This action will close the pick ticket and begin the retention period for cleaning up the pick ticket file.

The name of the file is the reel's ID with an extension of ".empty". The file can be empty, as the Label Control System will only look for the file name. The file will be deleted by the Label Control System.

INFOCOLOR 70 INTERFACE

The InfoColor 70 printer will RIP and print the PostScript files containing the labels to fill pick tickets. The Label Control System will use program interfaces to perform the following functions:

- send a print job for RIP by the InfoColor 70
- request that the RIPped print job be released for printing
- receive the status of the print job(s) such as held, printing, complete, canceled

User Interface:

The user interface to the Label Control System will be provided by the InfoPrint WorkFlow clients. The InfoPrint WorkFlow client provides a graphical user interface for displaying shop floor diagrams with an overview of the system, reports with detail information, and dialogs which allow the operator to control the system. The shop floor diagrams, reports and dialogs needed to monitor and control the Label Control System will be provided with the system. This section presents the function provided by the shop floor diagram, reports and dialogs.

SHOP FLOOR DIAGRAM

Shop floor diagrams give a pictorial view of the entire system and high level status of the system state. Examples of information which may be shown on the shop floor diagram include:

- how many labels have been batched and are waiting to complete printing
- how many labels have completed printing to the output spool of the Print line
- how many output spools are waiting for the Coat-Cut Line
- how many reels are waiting to complete application of their labels

The shop floor diagram will be linked to the reports described below to allow the operator to select any of the above items and display a report containing detail information for the item. In

addition, examples of menu items on the InfoPrint WorkFlow client may provide the following functions:

- Spools: identify the print output spool, identify the Coat-Cut input spool
- Reels: identify a Coat-Cut output reel, list reels that have not been emptied
- Pick tickets: list all pick tickets, list a single pick ticket
- System: display and change configurable parameters (maximum print batch size, number of test pages for the diecutter, etc.)
- Print Batches: initiate printing

REPORTS

InfoPrint WorkFlow reports display information in a tabular report. The reports allow links to other reports or dialogs when the user clicks on a particular row and column of the report. In addition the reports allow the user to sort the data in the report and list only certain rows of the report. The following report examples are the primary reports that may be provided.

Pick Ticket Report

The pick ticket report will display all of the pick tickets in the system. One row will be displayed for each pick ticket. The columns may include:

- Pick ticket name
- Number of labels for the pick ticket
- Reprint count: the number of times this pick ticket has been reprinted
- Processing: new, batched, printed, Coat-Cut, applied
- Status: usable, unusable
- Spool or Reel ID: the ID of the spool or reel holding this pick ticket (links to the spool or reel report)
- Print batch ID (links to the batch report)

Menu actions for this report may include:

- Pick ticket: mark unusable, mark usable
- Spool or Reel: mark all pick tickets unusable, display report for the spool or reel

Pick Ticket Report by Spool or Reel

This report is the same as the Pick ticket report but it limits the pick tickets displayed to only those on one spool or reel.

Pick Ticket Report by Print Batch

This report is the same as the Pick ticket report but limits the pick tickets displayed to only those for one print batch.

Spool or Reel Report

This report displays a list of the spools and reels in the system. The columns include:

- ID
- Type: spool or reel
- Status: usable, unusable, empty
- Device: printer, Coat-Cut, none
- Label count (links to the Pick ticket by Spool or Reel Report)

Menu actions for this report include:

- Spool or Reel: add, delete, mark usable, mark unusable, mount onto a device, dismount from a device
- Pick ticket: display Pick ticket Report by Spool or Reel

Print Batch Report

This report displays a list of the print batches that have been created. One row is displayed for each. The columns include:

- Print Batch ID
- Number of labels (links to the Pick ticket by Print Batch report)
- Status: waiting, printing, complete

DIALOGS

Dialogs allow the user to enter information and control the system. Dialogs can also link to reports or other dialogs. The data entered into one of the dialog fields can come from the keyboard or from the scanner attached to the InfoPrint WorkFlow client. The following dialog examples are the primary functions that may be provided.

Change Pick Ticket Status Dialog

This dialog is used to mark a pick ticket: usable or unusable. It supports a pick ticket name typed from the keyboard or scanned from any label in the pick ticket. In addition to the pick ticket name the dialog displays the current pick ticket status and allows the user to change the status to: usable or unusable.

Mount / Dismount Spool or Reel Dialog

This dialog allows the operator to indicate that a spool or reel has been mounted or dismounted from a device. It will support the spool or reel ID being typed from the keyboard or scanned

from a barcode on the spool/reel. The operator also needs to select the device and the action to take: mount or dismount.

Print Roll Size Dialog

This dialog allows the operator to let the system know the size of the input roll for the printer. This keeps the system from trying to print more labels onto the output spool than there is material on the input roll for the printer.

System Parameters Dialog

This dialog allows the operator to update the system parameters. These parameters include:

- Maximum number of labels per print batch
- Retention period for pick tickets after the reel is emptied
- Number of labels per inch on the input roll to the printer. This is used with the size of the input roll from the Print Roll Size Dialog to determine an approximate number of labels that can be printed from the input roll.

OPERATION

Setup:

1. New background images are created and loaded into file system.
2. New foreground images (ECP data, and caution) are created and loaded into file system.

Pre-Press:

1. Vistakon's Distribution System passes pick tickets to the Control System for printing.
2. Control System generates print jobs, ready to pass to printer.

Print Line:

1. Label material is threaded through Print Line, providing enough leader for the downstream operations (Coat-Cut Line and applicator).
2. Operator performs InfoColor 70 setup, including
   - printing test masters and adjusting image, paper, registration, and density
   - monitoring and adjusting paper surface potential
   - monitoring and adjusting print tower humidity and temperature
   - adjusting paper conditioning parameters
     See the referenced Operator's Guide
3. Operator informs Control System of available length of material.
4. Operator releases printer for print job and printing begins.
5. Periodic inspection while printing can be performed at the Inspection Station.
6. The rewind spool is filled and logged.
7. If needed, additional trailer is advanced, and the spool is dismounted.

Coat-Cut Line:

1. The printed roll is mounted onto the unwinder and threaded through the Coat-Cut line.
2. The diecutter is aligned to the first registration mark.
3. The operator begins coating and cutting.
4. When the input spool is empty, the operator notifies InfoPrint WorkFlow:
   - which spool had been mounted
   - which reels are being used in the 3-up rewinder
5. The full 3-up reels are dismounted from the rewinders.

VERIFICATION POINTS

Print Line - Inspection Station

- Densitometer
  - Print registration
  - Color density
- Subjective print quality
- Barcode scanner to log inspection

Print Line - Rewinder

- Barcode scanner or typed ID to note spool being used to wind up print job

Post Print-Line / Pre Coat-Cut Line Staging

- Barcode scanner or typed ID to identify spools that are off-line, while being staged between lines

Coat-Cut Line - Unwinder

- Barcode scanner or typed ID to note spool being mounted for diecutting
- Capable for both spools in dual unwinder

Coat-Cut Line - 3-up Rewinder

- Barcode scanner or typed ID to note reels being used to wind up slit 3-up columns of print job

Post-Coat-Cut Line Staging

- Barcode scanner or typed ID to identify reels that are off-line, while being staged between lines

<u>Barcode Scanners</u>

The verifications itemized above that involve barcode scanning can be accomplished using a barcode scanner located at each of the following:

- Client #1 - Near the Control System server
- Client #2 - Near the Inspection Station, Print Line Rewinder, and Coat-Cut Unwinder
- Client #3 - Near the Coat-Cut Line 3-up Rewinder

See Fig 1. Control System Block Diagram

PERFORMANCE

See the Example Processing and Operator Flow Attachment.

Throughput Calculations:

Pre-Press

- Pick tickets will need to be processed for job building and to RIP ahead prior to submitting the print job. Build-RIP-submit speeds vary with the amount of data that can be processed: RIPing a Master Label Page once is more efficient than RIPing the constant data for each variable page.

  Initial testing indicates that by including the background images in the master, the RIP times and printer storage capacity are adequate for the projections for average daily demand. The RIP speed for this sample is approximately equal to the print speed, though the RIP will be processed ahead.

Print Line

- The InfoColor 70 process speed is 24.1 feet per minute, or 267 labels per minute with the current label size and spacing assumptions.

Coat-Cut Line

- The diecut process speed in feet per minute (fpm) is a function of the repetition rate of the press and the material advance per press stroke. For example, if the advance is 12 inches and the press repetition rate is 60 strokes per minute (spm) the diecut process speed will be 60 fpm.

  The proposed 9-label pattern requires a material advance of 9.76 inches. The press repetition rate will be 65 spm with no allowance for registration. This results in a cycle time of 0.92 seconds. The time to register is dependent on the magnitude of the position error, and may require as much as 0.5 seconds (with large errors in both x and y directions). This would make the total cycle time 1.42 seconds. Thus, the repetition rate would be 42.25 spm and the diecut process speed would be 34 fpm or 378 labels per minute.

Exp cted Use:

Yield
- 100% of the labels submitted are expected to be produced without error, provided that all operator setup procedures are performed correctly.

Volume
- One 19.7 inch roll per day
- The pick ticket size is 1 to 1,296 labels (2 digits of base 36)
- The maximum print job size will be less than 1 whole roll

Up Time
- The InfoColor 70 will be available for printing about 60% to 65% of the time. The remainder is for service maintenance.
- The Coat-Cut Line will be available 95% of the time. The remainder is for maintenance.

PM Time
- The InfoColor 70 requires about 6 - 8 hours per week for operator maintenance.
- The Coat-Cut Line requires 20 minutes for every 24 hours of running time for operator maintenance.
- The varnisher requires a 20 minute cleaning every 40 hours of running time.
- The die should be changed every 0.5 to 1.5 million impressions.
- The diecutter hydraulic fluid filtration inspection/change is once every 2000 hours of run time.

MAINTENANCE AND SERVICE

Operator Maintenanc :

Print Line

- InfoColor 70
    - Cleaning:
        - and replacing coronas
        - of photoconductors
        - of printheads
        - of the paper transport
    - Supplies
        - adding toner
        - changing paper
        - changing toner waste bottles
        - filling the humidifier with water
        - emptying the water condensate bottles
- See the referenced Intro and Planning Guide

- Accumulator: none

- Rewinder: none

Coat-Cut Line

- Unwinder: none
- Coater/Dryer:
    - Add varnish (5 minutes)
    - Grease gears and clean pump/varnish chamber once every 40 hours of running time
- Accumulator: none
- Diecutter
    - Lubricate the guide posts (5 minutes)
    - Clean the feed rolls (10 minutes)
    - Change dies (less than 1 hour every 0.5 to 1.5 million cycles)
- Matrix/Slitter/Rewinder: dispose of matrix and edge trim

Control System

- System Backup
- Database Backup

Service Support:

INSTALLATION:

Environment:

InfoColor 70

- Optimal
  - 20° C (68° F) Minimum with 27 to 62% RH
  - 25° C (77° F) Maximum with 27 to 50% RH

- Acceptable
  - 15° C (59° F) Minimum with 16 to 65% RH
  - 30° C (86° F) Maximum with 27 to 50% RH

Other Environmental Considerations

- Paper storage
  - 20° C (59° F) Minimum with 27 to 62% RH
    Typo in the Intro & Planning Guide.
    Confirming which it is: 20° C (68° F) or 15° C (59° F)
  - 25° C (77° F) Maximum with 28 to 53% RH
  - For at least 3 days

- Paper conditioning just prior to printing
  - Same environment as the printer
  - For at least 24 hours before using

- Printed rolls (not coated/diecut yet), if temporarily staged

- Diecut label reels (not applied to carton yet), if temporarily staged

Coat-Cut Line

- Environmental requirements are much looser than for InfoColor 70
- Coat-cut line could be located outside of environmentally controlled room

Electrical Requirements

- See Print Line section. Electrical requirements are:

- For the InfoColor 70 see the referenced Intro and Planning Guide

  InfoColor 70   208-240 VAC 3 Ph 60 Hz 60 Amps

  Rewinder: 200-208 VAC 1 Ph 60 Hz 20 Amps

- See Coat-Cut Line section. Electrical requirements are:

  Unwinder: 120 VAC 60 Hz 15 Amps

  Varnisher/Cure: 120 VAC 60 Hz 10 Amps
                           400 Watt UV cure lamp

  Diecutter: 220-240 VAC 1 Ph 60 Hz 40 Amps, or
                           440-480 VAC 3 Ph 60 Hz 20 Amps

  Rewinders: 120 VAC 60 Hz 15 Amps

Pneumatic Requirements

- See Print Line section.

  Compressed air is required for the rewinder. Specification is to be determined.

- See Coat-Cut Line section

  Unwinder   80-100 psi at 0.5 cfm

  Varnish/Cure   80-100 psi at 0.5 cfm

  Diecutter   80-100 psi at 3-4 cfm

  Rewinder   80-100 psi at 0.5 cfm

Ventilation/exhaust Requirements

- See referenced InfoColor 70 Intro and Planning Guide

  Need for an active local exhaust from the machine depends on the size of the room and its air exchange rate.

- See Coater/UV Dryer in Coat-Cut Line section

  The specification for a duct from the coater/dryer is to be determined.

Acoustics

- The InfoColor 70 acoustic levels do not exceed 70 dB sound pressure.

- The diecutter acoustic levels do not exceed 85 dB sound pressure at the punch

Floor Space:

Print Line

- 27 feet long by 18 feet wide

- Includes InfoColor 70 and all of its peripheral components
  - Built-in roll feeder
  - Conditioning unit
  - Printing tower
  - Operator console
  - Cooling unit
  - Accumulator
  - Inspection station
  - Cutoff
  - Rewinder

- Includes working and service clearance around all components (about 1 meter)

- Note: During installation, the largest crate is
  216 cm (85 inches) high
  155 cm (61 inches) wide
  167 cm (66 inches) deep
  1292 kg (2849 lb.)

Coat-Cut Line

- 25 feet long by 10 feet wide

- Includes:
  - Unwinder (dual)
  - Coater
  - UV Drier
  - Accumulator
  - Diecutter
  - Matrix rewinder
  - 3-up slitter
  - 3-up cutoff
  - 3-up rewinder

- Includes working and service clearance

Once the Print Line and the Coat-Cut Line have been qualified, IBM will evaluate reduction in floor space.

Control System

- Included within Print and Coat-Cut Lines above

SERVICE

Hardware

IBM hardware support services includes hardware services for IBM systems and multi-vendor services for non-IBM systems. These services address all categories of clients and all kinds of systems and peripherals.

Software

Software support services includes software services for IBM operating systems, systems software and middleware over all IBM platforms, and selected services for multi-vendor software.

IBM Responsibilities

Hard-to-resolve problems receive prompt attention through a single point of contact. IBM takes responsibility for your hardware problem until its resolution.

Features:

- Single point of contact, available 24 hours a day for hardware repair at 1-800-IBM-SERV
- Includes remote technical support for faster problem resolution to help get problems solved quickly
- Offers one source to support IBM and multivendor products
- Databases with extensive machine service and problem resolution histories
- High-quality parts available when and where they are needed
- Remote and on site services specialists, each with a unique set of skills and experience, to address specific service requirements
- IBM product engineers, to assist with unique hardware problems
- Service planning experts, who ensure the right service resources are available now and in the future

Vistakon Responsibilities

IBM's delivery process begins the moment Vistakon places a service call to 1-800-IBM-SERV.

This telephone number provides remote problem determination. Remote problem determination has enabled IBM to resolve up to 30 percent of service calls over the telephone. If the problem can't be resolved remotely, IBM sends a services specialist with the right skills, parts, and action plan to fix the equipment, quickly.

TRAINING

InfoColor 70

Operators of the InfoColor 70 printer should have some digital pre-press and/or press experience. One or a combination of both of these experience levels is an excellent background for operating the InfoColor 70.

IBM provides complete operator training. The operator should be trained the week before or the same week that the InfoColor 70 is installed.

The training consists of hands-on instruction at Boulder and follow-up training at the customer's location.

Operators are responsible for the quality of all printed material. This requires general knowledge of concepts such as: color density, trapping, and registration.

Control System

The operator is expected to learn:

- basic AIX system administration tasks for backups, minor problem diagnosis and recovery, system and GUI startup, and network connection verification.

- basic NT end user tasks for minor problem diagnosis and recovery such as verifying network connections and starting the GUIs.

- to use the InfoPrint Workflow Client graphical user interface.

Post-Equipment

The non-IBM equipment vendors will participate in training on site during installation.

MATERIALS AND SUPPLIES

Ordering

See the reference Intro & Planning Guide.

To order supplies for the InfoColor 70 printer, any of the following methods can be used:

- Call Lexmark Order Management Center at 1-800-292-5885

- Write Lexmark at

  Lexmark International, Inc.
  Order Management Center
  P.O. Box 11427, Lexington
  KY 40575-1427

- Fax a completed order form to Lexmark at 1-800-232-9539

The InfoColor 70 supplies are:

- Toner. Four colors: Cyan, Magenta, Yellow, and Black

- Developer Mix - Version 2. Four colors: Cyan, Magenta, Yellow, and Black

- Toner Waste Bottles. Collect toner not consumed in the printing process. The waste bottles are replaced as they become full.

- Splicing Tape

- Label material

The post-equipment supplies are:

- Varnish
- Die replacement (or resharpening)

Detail for placing orders is to be determined.

REFERENCE

Vistakon On-Demand Labeler Requirements, M. Bartholet, 7/10/98

IBM InfoColor 70 Introduction and Planning Guide S544-5333-04

IBM InfoColor 70 Paper Selection Guide G544-5386-01

IBM InfoColor 70 Operator's Guide S544-5334-03

Paper Information for IBM InfoColor 70 M0398.DOC

Vistakon Acuvue Specialty 12 Pack Carton Blank 10013, Rev E

Vistakon, Johnson & Johnson Vision Products Inc. PQA R-3198
Vistakon Specialty Batch/Bulk Sterilization Secondary Packages

Vistakon, Johnson & Johnson Vision Products Inc. SGOP-0023, Rev B
Safety General Operating Procedure: Design, Procurement and Maintenance of Equipment and Processes.

GLOSSARY

3-Up	Simultaneously printing 3 columns of labels across the width of the web.
AIX	Advanced Interactive Executive. IBM's version of UNIX.
Applicator	A device which accepts discrete, self-adhesive labels on a continuous roll of backing material, removes the labels, and applies them sequentially to (in this case) cartons.
Client	The GUI component of an application.
Coat-Cut Line	The line of equipment which accepts the printed spools of labels from the Print Line and unwinds, varnishes, cures, diecuts, removes matrix, slits, trims, and rewinds.
Collator	Electronic storage for master and variable RIPped images.
Color Density	The degree of darkness or lack of reflectance from an area printed with one of four colors: cyan, magenta, yellow or black.
Control Strip	Printer-generated, postscript test pattern that can be added to each print page. Used with the Densitometer to measure Color Density and Print Registration.
Control System	Software and database to track and manage processing of workflow or events.
Cutoff	A device, manual or mechanized, for cutting across the web to end the roll which has preceded, and/or to begin the roll following.
DB2	IBM's relational data base system.
Densitometer	Handheld tool used with the printed Control Strip to input and update the printer process parameters for Color Density and Print Registration.
Dialog	GUI component that allows user input to a software application.
Dual Unwinder	Roll unwinder that can support two rolls. Unwinds them one at a time.
ECP	Eye Care Provider. The lens-prescribing physician.
Encapsulated PostScript	PostScript That can be included or referenced as a part of other PostScript files.

Finish	Any post-printing process, such as accumulate, varnish, cure, diecut, matrix-removal, slit, trim, or rewind
Graphic Image	A file that contains drawing instructions that will result in a picture for lines, curves, or objects.
GUI	Graphical User Interface. Allows end users to communicate and interact with the software applications.
InfoPrint Workflow	An IBM software solution to track and manage processes and events.
Kanji	A language that uses 2 bytes for each character due to the quantity of characters or "letters".
Master Label Page	The elements of the print job that are constant for each page.
Matrix	The skeleton of face material around the array of labels.
NFS	Network File System. Used to share files among systems.
On-Demand	The process of producing output when it is required rather than producing output according to a plan and storing until required.
Pick Ticket	The set of labels to be shipped to one ECP based on an order that has been received in Vistakon's Distribution System.
Pick Ticket Batch	All of the pick tickets that are grouped for one day of label processing.
Pinless	A web of printing material that does not have any rows of holes which would be used by tractors to drive the material.
Post-Equipment	Any equipment, in-line or off-line, that processes the web following the printer.
Pre-Equipment	Any equipment, in-line or off-line, that processes the web before the printer.
Print Job	A set of pick tickets that will become a single RIP and print request.
Print Line	The line of equipment in-line with the printer, including the accumulator, inspection station, and rewinder.
Print Registration	The accurate alignment of the four color separations of an image on top of each other.

Reel	The physical core that a slit, single column of labels is wound up on.
RIP	Raster Image Processing. Transforms input data to the form required for printing.
Server	The computer that is used for centralized processing, data storage, and data transfer.
SKU	Stock Keeping Unit. A unique part that is made ahead of time and stored for time of use.
Slitter	A rotating knife that is used in this application to cut the web into 3 separate columns of labels.
Spool	The physical core that a wide web of 3-up label columns is wound up on.
Text image	Encapsulated PostScript that contains text.
Tractor holes	The rows of holes along the edges of a web of printing material that a tractor mechanism engages to drive the web..
Trapping	In pre-press, how much adjacent colors overlap to eliminate white space in between. In printing, how well one layer of color toner adheres to a preexisting layer where there is overlap.
Variable Data	The elements of the print job that will be determined by the pick ticket and will change from page to page as they are merged with the Master Label Page.
Vistakon's Distribution Server	The Vistakon server which communicates to the Label Control System.
VSG	Vertical Stacker Grid. Vistakon's carton picking robot that stores prepackaged lenses, and selects them in sequence for the applicator, to match the sequence of the mounted reel of labels.

ATTACHMENTS

IBM's Label Material Manufacturer Spec Sheets

IBM's Label Layout Attachment

IBM's Diecutter Registration Mark Attachment

Vistakon's Carton Engineering Drawing Attachment

IBM's Print Line Layout Attachment

IBM's Coat-Cut Layout Attachment

IBM's Coat-Cut Controller Attachment

IBM's Example Processing and Operator Flow Attachment

IBM's Floor Plan Attachment

Vistakon's Printing System Interface Specifications Attachment

Vistakon's Label Dimensions Attachment

IBM's InfoPrint Software

IBM's AS/400 Connectivity